SEQUENCE LISTING

<110> Kirin Beer Kabushiki Kaisha; Japan International Research Center f
or Agricultural Sciences

<120> A production of plants having improved rooting efficiency and vase
life by using environmental stress-resistant gene

<130> PH-2034

<150> JP 2003-071082
<151> 2003-03-14

<160> 30

<210> 1
<211> 933
<212> DNA
<213> Arabidopsis thaliana

<220>
<221> CDS
<222> (119).. (766)

<400> 1
cctgaactag aacagaaaga gagagaaact attatttcag caaaccatac caacaaaaaa 60
gacagagatc ttttagttac cttatccagt ttcttgaaac agagtactct tctgatca 118
atg aac tca ttt tct gct ttt tct gaa atg ttt ggc tcc gat tac gag 166
Met Asn Ser Phe Ser Ala Phe Ser Glu Met Phe Gly Ser Asp Tyr Glu
1 5 10 15
tct tcg gtt tcc tca ggc ggt gat tat att ccg acg ctt gcg agc agc 214

```
Ser Ser Val Ser Ser Gly Gly Asp Tyr Ile Pro Thr Leu Ala Ser Ser
                20                  25                  30
tgc ccc aag aaa ccg gcg ggt cgt aag aag ttt cgt gag act cgt cac    262
Cys Pro Lys Lys Pro Ala Gly Arg Lys Lys Phe Arg Glu Thr Arg His
        35                  40                  45
cca ata tac aga gga gtt cgt cgg aga aac tcc ggt aag tgg gtt tgt    310
Pro Ile Tyr Arg Gly Val Arg Arg Arg Asn Ser Gly Lys Trp Val Cys
    50                  55                  60
gag gtt aga gaa cca aac aag aaa aca agg att tgg ctc gga aca ttt    358
Glu Val Arg Glu Pro Asn Lys Lys Thr Arg Ile Trp Leu Gly Thr Phe
65                  70                  75                  80
caa acc gct gag atg gca gct cga gct cac gac gtt gcc gct tta gcc    406
Gln Thr Ala Glu Met Ala Ala Arg Ala His Asp Val Ala Ala Leu Ala
                85                  90                  95
ctt cgt ggc cga tca gcc tgt ctc aat ttc gct gac tcg gct tgg aga    454
Leu Arg Gly Arg Ser Ala Cys Leu Asn Phe Ala Asp Ser Ala Trp Arg
            100                 105                 110
ctc cga atc ccg gaa tca act tgc gct aag gac atc caa aag gcg gcg    502
Leu Arg Ile Pro Glu Ser Thr Cys Ala Lys Asp Ile Gln Lys Ala Ala
        115                 120                 125
gct gaa gct gcg ttg gcg ttt cag gat gag atg tgt gat gcg acg acg    550
Ala Glu Ala Ala Leu Ala Phe Gln Asp Glu Met Cys Asp Ala Thr Thr
    130                 135                 140
gat cat ggc ttc gac atg gag gag acg ttg gtg gag gct att tac acg    598
Asp His Gly Phe Asp Met Glu Glu Thr Leu Val Glu Ala Ile Tyr Thr
145                 150                 155                 160
gcg gaa cag agc gaa aat gcg ttt tat atg cac gat gag gcg atg ttt    646
Ala Glu Gln Ser Glu Asn Ala Phe Tyr Met His Asp Glu Ala Met Phe
                165                 170                 175
gag atg ccg agt ttg ttg gct aat atg gca gaa ggg atg ctt ttg ccg    694
```

Glu Met Pro Ser Leu Leu Ala Asn Met Ala Glu Gly Met Leu Leu Pro
180 185 190

ctt ccg tcc gta cag tgg aat cat aat cat gaa gtc gac ggc gat gat 742
Leu Pro Ser Val Gln Trp Asn His Asn His Glu Val Asp Gly Asp Asp
195 200 205

gac gac gta tcg tta tgg agt tat taaaactcag attattattt ccatttttag 796
Asp Asp Val Ser Leu Trp Ser Tyr
210 215

tacgatactt tttattttat tattattttt agatcctttt ttagaatgga atcttcatta 856

tgtttgtaaa actgagaaac gagtgtaaat taaattgatt cagtttcagt ataaaaaaaa 916

aaaaaaaaaa aaaaaaa 933

<210> 2

<211> 216

<212> PRT

<213> Arabidopsis thaliana

<400> 2

Met Asn Ser Phe Ser Ala Phe Ser Glu Met Phe Gly Ser Asp Tyr Glu
1 5 10 15

Ser Ser Val Ser Ser Gly Gly Asp Tyr Ile Pro Thr Leu Ala Ser Ser
20 25 30

Cys Pro Lys Lys Pro Ala Gly Arg Lys Lys Phe Arg Glu Thr Arg His
35 40 45

Pro Ile Tyr Arg Gly Val Arg Arg Arg Asn Ser Gly Lys Trp Val Cys
50 55 60

Glu Val Arg Glu Pro Asn Lys Lys Thr Arg Ile Trp Leu Gly Thr Phe
65 70 75 80

Gln Thr Ala Glu Met Ala Ala Arg Ala His Asp Val Ala Ala Leu Ala
85 90 95

Leu Arg Gly Arg Ser Ala Cys Leu Asn Phe Ala Asp Ser Ala Trp Arg
100 105 110
Leu Arg Ile Pro Glu Ser Thr Cys Ala Lys Asp Ile Gln Lys Ala Ala
115 120 125
Ala Glu Ala Ala Leu Ala Phe Gln Asp Glu Met Cys Asp Ala Thr Thr
130 135 140
Asp His Gly Phe Asp Met Glu Glu Thr Leu Val Glu Ala Ile Tyr Thr
145 150 155 160
Ala Glu Gln Ser Glu Asn Ala Phe Tyr Met His Asp Glu Ala Met Phe
165 170 175
Glu Met Pro Ser Leu Leu Ala Asn Met Ala Glu Gly Met Leu Leu Pro
180 185 190
Leu Pro Ser Val Gln Trp Asn His Asn His Glu Val Asp Gly Asp Asp
195 200 205
Asp Asp Val Ser Leu Trp Ser Tyr
210 215

<210> 3
<211> 1437
<212> DNA
<213> Arabidopsis thaliana

<220>
<221> CDS
<222> (167)..(1171)
<400> 3
gctgtctgat aaaaagaaga ggaaaactcg aaaaagctac acacaagaag aagaagaaaa 60
gatacgagca agaagactaa acacgaaagc gatttatcaa ctcgaaggaa gagactttga 120
ttttcaaatt tcgtccccta tagattgtgt tgtttctggg aaggag atg gca gtt 175
Met Ala Val

1

tat gat cag agt gga gat aga aac aga aca caa att gat aca tcg agg 223
Tyr Asp Gln Ser Gly Asp Arg Asn Arg Thr Gln Ile Asp Thr Ser Arg
5 10 15

aaa agg aaa tct aga agt aga ggt gac ggt act act gtg gct gag aga 271
Lys Arg Lys Ser Arg Ser Arg Gly Asp Gly Thr Thr Val Ala Glu Arg
20 25 30 35

tta aag aga tgg aaa gag tat aac gag acc gta gaa gaa gtt tct acc 319
Leu Lys Arg Trp Lys Glu Tyr Asn Glu Thr Val Glu Glu Val Ser Thr
40 45 50

aag aag agg aaa gta cct gcg aaa ggg tcg aag aag ggt tgt atg aaa 367
Lys Lys Arg Lys Val Pro Ala Lys Gly Ser Lys Lys Gly Cys Met Lys
55 60 65

ggt aaa gga gga cca gag aat agc cga tgt agt ttc aga gga gtt agg 415
Gly Lys Gly Gly Pro Glu Asn Ser Arg Cys Ser Phe Arg Gly Val Arg
70 75 80

caa agg att tgg ggt aaa tgg gtt gct gag atc aga gag cct aat cga 463
Gln Arg Ile Trp Gly Lys Trp Val Ala Glu Ile Arg Glu Pro Asn Arg
85 90 95

ggt agc agg ctt tgg ctt ggt act ttc cct act gct caa gaa gct gct 511
Gly Ser Arg Leu Trp Leu Gly Thr Phe Pro Thr Ala Gln Glu Ala Ala
100 105 110 115

tct gct tat gat gag gct gct aaa gct atg tat ggt cct ttg gct cgt 559
Ser Ala Tyr Asp Glu Ala Ala Lys Ala Met Tyr Gly Pro Leu Ala Arg
120 125 130

ctt aat ttc cct cgg tct gat gcg tct gag gtt acg agt acc tca agt 607
Leu Asn Phe Pro Arg Ser Asp Ala Ser Glu Val Thr Ser Thr Ser Ser
135 140 145

cag tct gag gtg tgt act gtt gag act cct ggt tgt gtt cat gtg aaa 655
Gln Ser Glu Val Cys Thr Val Glu Thr Pro Gly Cys Val His Val Lys

```
          150                 155                 160
aca gag gat cca gat tgt gaa tct aaa ccc ttc tcc ggt gga gtg gag    703
Thr Glu Asp Pro Asp Cys Glu Ser Lys Pro Phe Ser Gly Gly Val Glu
     165                 170                 175
ccg atg tat tgt ctg gag aat ggt gcg gaa gag atg aag aga ggt gtt    751
Pro Met Tyr Cys Leu Glu Asn Gly Ala Glu Glu Met Lys Arg Gly Val
180                 185                 190                 195
aaa gcg gat aag cat tgg ctg agc gag ttt gaa cat aac tat tgg agt    799
Lys Ala Asp Lys His Trp Leu Ser Glu Phe Glu His Asn Tyr Trp Ser
                200                 205                 210
gat att ctg aaa gag aaa gag aaa cag aag gag caa ggg att gta gaa    847
Asp Ile Leu Lys Glu Lys Glu Lys Gln Lys Glu Gln Gly Ile Val Glu
            215                 220                 225
acc tgt cag caa caa cag cag gat tcg cta tct gtt gca gac tat ggt    895
Thr Cys Gln Gln Gln Gln Gln Asp Ser Leu Ser Val Ala Asp Tyr Gly
        230                 235                 240
tgg ccc aat gat gtg gat cag agt cac ttg gat tct tca gac atg ttt    943
Trp Pro Asn Asp Val Asp Gln Ser His Leu Asp Ser Ser Asp Met Phe
    245                 250                 255
gat gtc gat gag ctt cta cgt gac cta aat ggc gac gat gtg ttt gca    991
Asp Val Asp Glu Leu Leu Arg Asp Leu Asn Gly Asp Asp Val Phe Ala
260                 265                 270                 275
ggc tta aat cag gac cgg tac ccg ggg aac agt gtt gcc aac ggt tca   1039
Gly Leu Asn Gln Asp Arg Tyr Pro Gly Asn Ser Val Ala Asn Gly Ser
                280                 285                 290
tac agg ccc gag agt caa caa agt ggt ttt gat ccg cta caa agc ctc   1087
Tyr Arg Pro Glu Ser Gln Gln Ser Gly Phe Asp Pro Leu Gln Ser Leu
            295                 300                 305
aac tac gga ata cct ccg ttt cag ctc gag gga aag gat ggt aat gga   1135
Asn Tyr Gly Ile Pro Pro Phe Gln Leu Glu Gly Lys Asp Gly Asn Gly
```

310 315 320

ttc ttc gac gac ttg agt tac ttg gat ctg gag aac taaacaaaac 1181
Phe Phe Asp Asp Leu Ser Tyr Leu Asp Leu Glu Asn
325 330 335

aatatgaagc tttttggatt tgatatttgc cttaatccca caacgactgt tgattctcta 1241
tccgagtttt agtgatatag agaactacag aacacgtttt ttcttgttat aaaggtgaac 1301
tgtatatatc gaaacagtga tatgacaata gagaagacaa ctatagtttg ttagtctgct 1361
tctcttaagt tgttctttag atatgtttta tgttttgtaa caacaggaat gaataataca 1421
cacttgtaaa aaaaaa 1437

<210> 4
<211> 335
<212> PRT
<213> Arabidopsis thaliana

<400> 4
Met Ala Val Tyr Asp Gln Ser Gly Asp Arg Asn Arg Thr Gln Ile Asp
1 5 10 15
Thr Ser Arg Lys Arg Lys Ser Arg Ser Arg Gly Asp Gly Thr Thr Val
20 25 30
Ala Glu Arg Leu Lys Arg Trp Lys Glu Tyr Asn Glu Thr Val Glu Glu
35 40 45
Val Ser Thr Lys Lys Arg Lys Val Pro Ala Lys Gly Ser Lys Lys Gly
50 55 60
Cys Met Lys Gly Lys Gly Gly Pro Glu Asn Ser Arg Cys Ser Phe Arg
65 70 75 80
Gly Val Arg Gln Arg Ile Trp Gly Lys Trp Val Ala Glu Ile Arg Glu
85 90 95
Pro Asn Arg Gly Ser Arg Leu Trp Leu Gly Thr Phe Pro Thr Ala Gln
100 105 110

Glu Ala Ala Ser Ala Tyr Asp Glu Ala Ala Lys Ala Met Tyr Gly Pro
115 120 125
Leu Ala Arg Leu Asn Phe Pro Arg Ser Asp Ala Ser Glu Val Thr Ser
130 135 140
Thr Ser Ser Gln Ser Glu Val Cys Thr Val Glu Thr Pro Gly Cys Val
145 150 155 160
His Val Lys Thr Glu Asp Pro Asp Cys Glu Ser Lys Pro Phe Ser Gly
165 170 175
Gly Val Glu Pro Met Tyr Cys Leu Glu Asn Gly Ala Glu Glu Met Lys
180 185 190
Arg Gly Val Lys Ala Asp Lys His Trp Leu Ser Glu Phe Glu His Asn
195 200 205
Tyr Trp Ser Asp Ile Leu Lys Glu Lys Glu Lys Gln Lys Glu Gln Gly
210 215 220
Ile Val Glu Thr Cys Gln Gln Gln Gln Gln Asp Ser Leu Ser Val Ala
225 230 235 240
Asp Tyr Gly Trp Pro Asn Asp Val Asp Gln Ser His Leu Asp Ser Ser
245 250 255
Asp Met Phe Asp Val Asp Glu Leu Leu Arg Asp Leu Asn Gly Asp Asp
260 265 270
Val Phe Ala Gly Leu Asn Gln Asp Arg Tyr Pro Gly Asn Ser Val Ala
275 280 285
Asn Gly Ser Tyr Arg Pro Glu Ser Gln Gln Ser Gly Phe Asp Pro Leu
290 295 300
Gln Ser Leu Asn Tyr Gly Ile Pro Pro Phe Gln Leu Glu Gly Lys Asp
305 310 315 320
Gly Asn Gly Phe Phe Asp Asp Leu Ser Tyr Leu Asp Leu Glu Asn
325 330 335

<210> 5

<211> 937

<212> DNA

<213> Arabidopsis thaliana

<220>

<221> CDS

<222> (164).. (802)

<400> 5

cttgaaaaag aatctacctg aaaagaaaaa aaagagagag agatataaat agctttacca 60

agacagatat actatctttt attaatccaa aaagactgag aactctagta actacgtact 120

acttaaacct tatccagttt cttgaaacag agtactctga tca atg aac tca ttt 175
Met Asn Ser Phe
1

tca gct ttt tct gaa atg ttt ggc tcc gat tac gag cct caa ggc gga 223
Ser Ala Phe Ser Glu Met Phe Gly Ser Asp Tyr Glu Pro Gln Gly Gly
5 10 15 20

gat tat tgt ccg acg ttg gcc acg agt tgt ccg aag aaa ccg gcg ggc 271
Asp Tyr Cys Pro Thr Leu Ala Thr Ser Cys Pro Lys Lys Pro Ala Gly
25 30 35

cgt aag aag ttt cgt gag act cgt cac cca att tac aga gga gtt cgt 319
Arg Lys Lys Phe Arg Glu Thr Arg His Pro Ile Tyr Arg Gly Val Arg
40 45 50

caa aga aac tcc ggt aag tgg gtt tct gaa gtg aga gag cca aac aag 367
Gln Arg Asn Ser Gly Lys Trp Val Ser Glu Val Arg Glu Pro Asn Lys
55 60 65

aaa acc agg att tgg ctc ggg act ttc caa acc gct gag atg gca gct 415
Lys Thr Arg Ile Trp Leu Gly Thr Phe Gln Thr Ala Glu Met Ala Ala
70 75 80

cgt gct cac gac gtc gct gca tta gcc ctc cgt ggc cga tca gca tgt 463
Arg Ala His Asp Val Ala Ala Leu Ala Leu Arg Gly Arg Ser Ala Cys
85 90 95 100
ctc aac ttc gct gac tcg gct tgg cgg cta cga atc ccg gag tca aca 511
Leu Asn Phe Ala Asp Ser Ala Trp Arg Leu Arg Ile Pro Glu Ser Thr
105 110 115
tgc gcc aag gat atc caa aaa gcg gct gct gaa gcg gcg ttg gct ttt 559
Cys Ala Lys Asp Ile Gln Lys Ala Ala Ala Glu Ala Ala Leu Ala Phe
120 125 130
caa gat gag acg tgt gat acg acg acc acg aat cat ggc ctg gac atg 607
Gln Asp Glu Thr Cys Asp Thr Thr Thr Thr Asn His Gly Leu Asp Met
135 140 145
gag gag acg atg gtg gaa gct att tat aca ccg gaa cag agc gaa ggt 655
Glu Glu Thr Met Val Glu Ala Ile Tyr Thr Pro Glu Gln Ser Glu Gly
150 155 160
gcg ttt tat atg gat gag gag aca atg ttt ggg atg ccg act ttg ttg 703
Ala Phe Tyr Met Asp Glu Glu Thr Met Phe Gly Met Pro Thr Leu Leu
165 170 175 180
gat aat atg gct gaa ggc atg ctt tta ccg ccg ccg tct gtt caa tgg 751
Asp Asn Met Ala Glu Gly Met Leu Leu Pro Pro Pro Ser Val Gln Trp
185 190 195
aat cat aat tat gac ggc gaa gga gat ggt gac gtg tcg ctt tgg agt 799
Asn His Asn Tyr Asp Gly Glu Gly Asp Gly Asp Val Ser Leu Trp Ser
200 205 210
tac taatattcga tagtcgtttc catttttgta ctatagtttg aaaatattct 852
Tyr
agttcctttt tttagaatgg ttccttcatt ttattttatt ttattgttgt agaaacgagt 912
ggaaaataat tcaatacaaa aaaaa 937

<210> 6

<211> 213

<212> PRT

<213> Arabidopsis thaliana

<400> 6

```
Met Asn Ser Phe Ser Ala Phe Ser Glu Met Phe Gly Ser Asp Tyr Glu
  1               5                  10                  15
Pro Gln Gly Gly Asp Tyr Cys Pro Thr Leu Ala Thr Ser Cys Pro Lys
             20                  25                  30
Lys Pro Ala Gly Arg Lys Lys Phe Arg Glu Thr Arg His Pro Ile Tyr
         35                  40                  45
Arg Gly Val Arg Gln Arg Asn Ser Gly Lys Trp Val Ser Glu Val Arg
     50                  55                  60
Glu Pro Asn Lys Lys Thr Arg Ile Trp Leu Gly Thr Phe Gln Thr Ala
 65                  70                  75                  80
Glu Met Ala Ala Arg Ala His Asp Val Ala Ala Leu Ala Leu Arg Gly
                 85                  90                  95
Arg Ser Ala Cys Leu Asn Phe Ala Asp Ser Ala Trp Arg Leu Arg Ile
            100                 105                 110
Pro Glu Ser Thr Cys Ala Lys Asp Ile Gln Lys Ala Ala Ala Glu Ala
        115                 120                 125
Ala Leu Ala Phe Gln Asp Glu Thr Cys Asp Thr Thr Thr Thr Asn His
    130                 135                 140
Gly Leu Asp Met Glu Glu Thr Met Val Glu Ala Ile Tyr Thr Pro Glu
145                 150                 155                 160
Gln Ser Glu Gly Ala Phe Tyr Met Asp Glu Glu Thr Met Phe Gly Met
                165                 170                 175
Pro Thr Leu Leu Asp Asn Met Ala Glu Gly Met Leu Leu Pro Pro Pro
            180                 185                 190
Ser Val Gln Trp Asn His Asn Tyr Asp Gly Glu Gly Asp Gly Asp Val
```

195 200 205

Ser Leu Trp Ser Tyr
210

<210> 7
<211> 944
<212> DNA
<213> Arabidopsis thaliana

<220>
<221> CDS
<222> (135).. (782)

<400> 7

cctgaattag aaaagaaaga tagatagaga aataaatatt ttatcatacc atacaaaaaa 60
agacagagat cttctactta ctctactctc ataaacctta tccagtttct tgaaacagag 120
tactcttctg atca atg aac tca ttt tct gcc ttt tct gaa atg ttt ggc 170
Met Asn Ser Phe Ser Ala Phe Ser Glu Met Phe Gly
1 5 10

tcc gat tac gag tct ccg gtt tcc tca ggc ggt gat tac agt ccg aag 218
Ser Asp Tyr Glu Ser Pro Val Ser Ser Gly Gly Asp Tyr Ser Pro Lys
15 20 25

ctt gcc acg agc tgc ccc aag aaa cca gcg gga agg aag aag ttt cgt 266
Leu Ala Thr Ser Cys Pro Lys Lys Pro Ala Gly Arg Lys Lys Phe Arg
30 35 40

gag act cgt cac cca att tac aga gga gtt cgt caa aga aac tcc ggt 314
Glu Thr Arg His Pro Ile Tyr Arg Gly Val Arg Gln Arg Asn Ser Gly
45 50 55 60

aag tgg gtg tgt gag ttg aga gag cca aac aag aaa acg agg att tgg 362
Lys Trp Val Cys Glu Leu Arg Glu Pro Asn Lys Lys Thr Arg Ile Trp

65 70 75

ctc ggg act ttc caa acc gct gag atg gca gct cgt gct cac gac gtc 410
Leu Gly Thr Phe Gln Thr Ala Glu Met Ala Ala Arg Ala His Asp Val
80 85 90

gcc gcc ata gct ctc cgt ggc aga tct gcc tgt ctc aat ttc gct gac 458
Ala Ala Ile Ala Leu Arg Gly Arg Ser Ala Cys Leu Asn Phe Ala Asp
95 100 105

tcg gct tgg cgg cta cga atc ccg gaa tca acc tgt gcc aag gaa atc 506
Ser Ala Trp Arg Leu Arg Ile Pro Glu Ser Thr Cys Ala Lys Glu Ile
110 115 120

caa aag gcg gcg gct gaa gcc gcg ttg aat ttt caa gat gag atg tgt 554
Gln Lys Ala Ala Ala Glu Ala Ala Leu Asn Phe Gln Asp Glu Met Cys
125 130 135 140

cat atg acg acg gat gct cat ggt ctt gac atg gag gag acc ttg gtg 602
His Met Thr Thr Asp Ala His Gly Leu Asp Met Glu Glu Thr Leu Val
145 150 155

gag gct att tat acg ccg gaa cag agc caa gat gcg ttt tat atg gat 650
Glu Ala Ile Tyr Thr Pro Glu Gln Ser Gln Asp Ala Phe Tyr Met Asp
160 165 170

gaa gag gcg atg ttg ggg atg tct agt ttg ttg gat aac atg gcc gaa 698
Glu Glu Ala Met Leu Gly Met Ser Ser Leu Leu Asp Asn Met Ala Glu
175 180 185

ggg atg ctt tta ccg tcg ccg tcg gtt caa tgg aac tat aat ttt gat 746
Gly Met Leu Leu Pro Ser Pro Ser Val Gln Trp Asn Tyr Asn Phe Asp
190 195 200

gtc gag gga gat gat gac gtg tcc tta tgg agc tat taaaattcga 792
Val Glu Gly Asp Asp Asp Val Ser Leu Trp Ser Tyr
205 210 215

ttttttatttc cattttggt attatagctt tttatacatt tgatcctttt ttagaatgga 852

tcttcttctt tttttggttg tgagaaacga atgtaaatgg taaaagttgt tgtcaaatgc 912

aaatgttttt gagtgcagaa tatataatct tt 944

<210> 8

<211> 216

<212> PRT

<213> Arabidopsis thaliana

<400> 8

Met Asn Ser Phe Ser Ala Phe Ser Glu Met Phe Gly Ser Asp Tyr Glu
1 5 10 15

Ser Pro Val Ser Ser Gly Gly Asp Tyr Ser Pro Lys Leu Ala Thr Ser
20 25 30

Cys Pro Lys Lys Pro Ala Gly Arg Lys Lys Phe Arg Glu Thr Arg His
35 40 45

Pro Ile Tyr Arg Gly Val Arg Gln Arg Asn Ser Gly Lys Trp Val Cys
50 55 60

Glu Leu Arg Glu Pro Asn Lys Lys Thr Arg Ile Trp Leu Gly Thr Phe
65 70 75 80

Gln Thr Ala Glu Met Ala Ala Arg Ala His Asp Val Ala Ala Ile Ala
85 90 95

Leu Arg Gly Arg Ser Ala Cys Leu Asn Phe Ala Asp Ser Ala Trp Arg
100 105 110

Leu Arg Ile Pro Glu Ser Thr Cys Ala Lys Glu Ile Gln Lys Ala Ala
115 120 125

Ala Glu Ala Ala Leu Asn Phe Gln Asp Glu Met Cys His Met Thr Thr
130 135 140

Asp Ala His Gly Leu Asp Met Glu Glu Thr Leu Val Glu Ala Ile Tyr
145 150 155 160

Thr Pro Glu Gln Ser Gln Asp Ala Phe Tyr Met Asp Glu Glu Ala Met
165 170 175

Leu Gly Met Ser Ser Leu Leu Asp Asn Met Ala Glu Gly Met Leu Leu
180 185 190
Pro Ser Pro Ser Val Gln Trp Asn Tyr Asn Phe Asp Val Glu Gly Asp
195 200 205
Asp Asp Val Ser Leu Trp Ser Tyr
210 215

<210> 9
<211> 1513
<212> DNA
<213> Arabidopsis thaliana

<220>
<221> CDS
<222> (183)..(1172)

<220>
<221> misc_feature
<222> (1443), (1444), (1447), (1450), (1459), (1472), (1495), (1508), (1510)
<223> n is A, C, G or T

<400> 9
gagacgctag aaagaacgcg aaagcttgcg aagaagattt gcttttgatc gacttaacac 60
gaacaacaaa caacatctgc gtgataaaga agagattttt gcctaaataa agaagagatt 120
cgactctaat cctggagtta tcattcacga tagattctta gattgcgact ataaagaaga 180
ag atg gct gta tat gaa caa acc gga acc gag cag ccg aag aaa agg 227
Met Ala Val Tyr Glu Gln Thr Gly Thr Glu Gln Pro Lys Lys Arg
1 5 10 15
aaa tct agg gct cga gca ggt ggt tta acg gtg gct gat agg cta aag 275

Lys Ser Arg Ala Arg Ala Gly Gly Leu Thr Val Ala Asp Arg Leu Lys
20 25 30

aag tgg aaa gag tac aac gag att gtt gaa gct tcg gct gtt aaa gaa 323
Lys Trp Lys Glu Tyr Asn Glu Ile Val Glu Ala Ser Ala Val Lys Glu
35 40 45

gga gag aaa ccg aaa cgc aaa gtt cct gcg aaa ggg tcg aag aaa ggt 371
Gly Glu Lys Pro Lys Arg Lys Val Pro Ala Lys Gly Ser Lys Lys Gly
50 55 60

tgt atg aag ggt aaa gga gga cca gat aat tct cac tgt agt ttt aga 419
Cys Met Lys Gly Lys Gly Gly Pro Asp Asn Ser His Cys Ser Phe Arg
65 70 75

gga gtt aga caa agg att tgg ggt aaa tgg gtt gca gag att cga gaa 467
Gly Val Arg Gln Arg Ile Trp Gly Lys Trp Val Ala Glu Ile Arg Glu
80 85 90 95

ccg aaa ata gga act aga ctt tgg ctt ggt act ttt cct acc gcg gaa 515
Pro Lys Ile Gly Thr Arg Leu Trp Leu Gly Thr Phe Pro Thr Ala Glu
100 105 110

aaa gct gct tcc gct tat gat gaa gcg gct acc gct atg tac ggt tca 563
Lys Ala Ala Ser Ala Tyr Asp Glu Ala Ala Thr Ala Met Tyr Gly Ser
115 120 125

ttg gct cgt ctt aac ttc cct cag tct gtt ggg tct gag ttt act agt 611
Leu Ala Arg Leu Asn Phe Pro Gln Ser Val Gly Ser Glu Phe Thr Ser
130 135 140

acg tct agt caa tct gag gtg tgt acg gtt gaa aat aag gcg gtt gtt 659
Thr Ser Ser Gln Ser Glu Val Cys Thr Val Glu Asn Lys Ala Val Val
145 150 155

tgt ggt gat gtt tgt gtg aag cat gaa gat act gat tgt gaa tct aat 707
Cys Gly Asp Val Cys Val Lys His Glu Asp Thr Asp Cys Glu Ser Asn
160 165 170 175

cca ttt agt cag att tta gat gtt aga gaa gag tct tgt gga acc agg 755

```
Pro Phe Ser Gln Ile Leu Asp Val Arg Glu Glu Ser Cys Gly Thr Arg
                180                 185                 190
ccg gac agt tgc acg gtt gga cat caa gat atg aat tct tcg ctg aat    803
Pro Asp Ser Cys Thr Val Gly His Gln Asp Met Asn Ser Ser Leu Asn
            195                 200                 205
tac gat ttg ctg tta gag ttt gag cag cag tat tgg ggc caa gtt ttg    851
Tyr Asp Leu Leu Leu Glu Phe Glu Gln Gln Tyr Trp Gly Gln Val Leu
        210                 215                 220
cag gag aaa gag aaa ccg aag cag gaa gaa gag gag ata cag caa cag    899
Gln Glu Lys Glu Lys Pro Lys Gln Glu Glu Glu Glu Ile Gln Gln Gln
    225                 230                 235
caa cag gaa cag caa cag caa cag ctg caa ccg gat ttg ctt act gtt    947
Gln Gln Glu Gln Gln Gln Gln Gln Leu Gln Pro Asp Leu Leu Thr Val
240                 245                 250                 255
gca gat tac ggt tgg cct tgg tct aat gat att gta aat gat cag act    995
Ala Asp Tyr Gly Trp Pro Trp Ser Asn Asp Ile Val Asn Asp Gln Thr
                260                 265                 270
tct tgg gat cct aat gag tgc ttt gat att aat gaa ctc ctt gga gat   1043
Ser Trp Asp Pro Asn Glu Cys Phe Asp Ile Asn Glu Leu Leu Gly Asp
            275                 280                 285
ttg aat gaa cct ggt ccc cat cag agc caa gac caa aac cac gta aat   1091
Leu Asn Glu Pro Gly Pro His Gln Ser Gln Asp Gln Asn His Val Asn
        290                 295                 300
tct ggt agt tat gat ttg cat ccg ctt cat ctc gag cca cac gat ggt   1139
Ser Gly Ser Tyr Asp Leu His Pro Leu His Leu Glu Pro His Asp Gly
    305                 310                 315
cac gag ttc aat ggt ttg agt tct ctg gat att tgagagttct gaggcaatgg 1192
His Glu Phe Asn Gly Leu Ser Ser Leu Asp Ile
320                 325                 330
tcctacaaga ctacaacata atctttggat tgatcatagg agaaacaaga aataggtgtt 1252
```

aatgatctga ttcacaatga aaaaatattt aataactcta tagttttgt tctttccttg 1312
gatcatgaac tgttgcttct catctattga gttaatatag cgaatagcag agtttctctc 1372
tttcttctct ttgtagaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaayh sakmabgcar 1432
srcsdvsnaa nntrnatnar sarchcntrr agrctrascn csrcaswash tskbabarak 1492
aantamaysa kmasrngnga c 1513

<210> 10
<211> 330
<212> PRT
<213> Arabidopsis thaliana
<400> 10

Met Ala Val Tyr Glu Gln Thr Gly Thr Glu Gln Pro Lys Lys Arg Lys
1 5 10 15
Ser Arg Ala Arg Ala Gly Gly Leu Thr Val Ala Asp Arg Leu Lys Lys
20 25 30
Trp Lys Glu Tyr Asn Glu Ile Val Glu Ala Ser Ala Val Lys Glu Gly
35 40 45
Glu Lys Pro Lys Arg Lys Val Pro Ala Lys Gly Ser Lys Lys Gly Cys
50 55 60
Met Lys Gly Lys Gly Gly Pro Asp Asn Ser His Cys Ser Phe Arg Gly
65 70 75 80
Val Arg Gln Arg Ile Trp Gly Lys Trp Val Ala Glu Ile Arg Glu Pro
85 90 95
Lys Ile Gly Thr Arg Leu Trp Leu Gly Thr Phe Pro Thr Ala Glu Lys
100 105 110
Ala Ala Ser Ala Tyr Asp Glu Ala Ala Thr Ala Met Tyr Gly Ser Leu
115 120 125
Ala Arg Leu Asn Phe Pro Gln Ser Val Gly Ser Glu Phe Thr Ser Thr
130 135 140
Ser Ser Gln Ser Glu Val Cys Thr Val Glu Asn Lys Ala Val Val Cys

145 150 155 160

Gly Asp Val Cys Val Lys His Glu Asp Thr Asp Cys Glu Ser Asn Pro
165 170 175

Phe Ser Gln Ile Leu Asp Val Arg Glu Glu Ser Cys Gly Thr Arg Pro
180 185 190

Asp Ser Cys Thr Val Gly His Gln Asp Met Asn Ser Ser Leu Asn Tyr
195 200 205

Asp Leu Leu Leu Glu Phe Glu Gln Gln Tyr Trp Gly Gln Val Leu Gln
210 215 220

Glu Lys Glu Lys Pro Lys Gln Glu Glu Glu Glu Ile Gln Gln Gln Gln
225 230 235 240

Gln Glu Gln Gln Gln Gln Gln Leu Gln Pro Asp Leu Leu Thr Val Ala
245 250 255

Asp Tyr Gly Trp Pro Trp Ser Asn Asp Ile Val Asn Asp Gln Thr Ser
260 265 270

Trp Asp Pro Asn Glu Cys Phe Asp Ile Asn Glu Leu Leu Gly Asp Leu
275 280 285

Asn Glu Pro Gly Pro His Gln Ser Gln Asp Gln Asn His Val Asn Ser
290 295 300

Gly Ser Tyr Asp Leu His Pro Leu His Leu Glu Pro His Asp Gly His
305 310 315 320

Glu Phe Asn Gly Leu Ser Ser Leu Asp Ile
325 330

<210> 11

<211> 675

<212> DNA

<213> Arabidopsis thaliana

<400> 11

atgaatccat tttactctac attcccagac tcgtttctct caatctccga tcatagatct 60
ccggtttcag acagtagtga gtgttcacca aagttagctt caagttgtcc aaagaaacga 120
gctgggagga agaagtttcg tgagacacgt catccgattt acagaggagt tcgtcagagg 180
aattctggta aatgggtttg tgaagttaga gagcctaata agaaatctag gatttggtta 240
ggtacttttc cgacggttga aatggctgct cgtgctcatg atgttgctgc tttagctctt 300
cgtggtcgct ctgcttgtct caatttcgct gattctgctt ggcggcttcg tattcctgag 360
actacttgtc ctaaggagat tcagaaagct gcgtctgaag ctgcaatggc gtttcagaat 420
gagactacga cggagggatc taaaactgcg gcggaggcag aggaggcggc aggggagggg 480
gtgagggagg gggagaggag ggcggaggag cagaatggtg gtgtgtttta tatggatgat 540
gaggcgcttt tggggatgcc caacttttt gagaatatgg cggaggggat gcttttgccg 600
ccgccggaag ttggctggaa tcataacgac tttgacggag tgggtgacgt gtcactctgg 660
agttttgacg agtaa 675

<210> 12
<211> 224
<212> PRT
<213> Arabidopsis thaliana

<400> 12

Met Asn Pro Phe Tyr Ser Thr Phe Pro Asp Ser Phe Leu Ser Ile Ser
1 5 10 15

Asp His Arg Ser Pro Val Ser Asp Ser Ser Glu Cys Ser Pro Lys Leu
20 25 30

Ala Ser Ser Cys Pro Lys Lys Arg Ala Gly Arg Lys Lys Phe Arg Glu
35 40 45

Thr Arg His Pro Ile Tyr Arg Gly Val Arg Gln Arg Asn Ser Gly Lys
50 55 60

Trp Val Cys Glu Val Arg Glu Pro Asn Lys Lys Ser Arg Ile Trp Leu
65 70 75 80

Gly Thr Phe Pro Thr Val Glu Met Ala Ala Arg Ala His Asp Val Ala
85 90 95

Ala Leu Ala Leu Arg Gly Arg Ser Ala Cys Leu Asn Phe Ala Asp Ser
100 105 110

Ala Trp Arg Leu Arg Ile Pro Glu Thr Thr Cys Pro Lys Glu Ile Gln
115 120 125

Lys Ala Ala Ser Glu Ala Ala Met Ala Phe Gln Asn Glu Thr Thr Thr
130 135 140

Glu Gly Ser Lys Thr Ala Ala Glu Ala Glu Glu Ala Ala Gly Glu Gly
145 150 155 160

Val Arg Glu Gly Glu Arg Arg Ala Glu Glu Gln Asn Gly Gly Val Phe
165 170 175

Tyr Met Asp Asp Glu Ala Leu Leu Gly Met Pro Asn Phe Phe Glu Asn
180 185 190

Met Ala Glu Gly Met Leu Leu Pro Pro Pro Glu Val Gly Trp Asn His
195 200 205

Asn Asp Phe Asp Gly Val Gly Asp Val Ser Leu Trp Ser Phe Asp Glu
210 215 220

<210> 13

<211> 546

<212> DNA

<213> Arabidopsis thaliana

<400> 13

atggaaaacg acgatatcac cgtggcggag atgaagccaa agaagcgtgc tggacggagg 60

attttcaagg agacacgtca cccaatctac agaggcgtgc ggcgtaggga cggcgacaaa 120

tgggtatgcg aagtccgtga accgattcat cagcgtcgag tctggctcgg aacttatccg 180

acggcagata tggccgcacg tgctcacgac gtggcggttc ttgctctgcg cgggagatcc 240

gcgtgtttga atttctccga ttctgcttgg aggttgccgg tgccggcatc cactgatccg 300

gacacgatca ggcgcacggc ggccgaagca gcggagatgt tcaggccgcc ggagtttagt 360

acaggaatta cggttttacc ctcagccagt gagtttgaca cgtcggatga aggagtcgct 420

ggaatgatga tgaggctcgc ggaggagccg ttgatgtcgc cgccaagatc gtacattgat 480

atgaatacga gtgtgtacgt ggacgaagaa atgtgttacg aagatttgtc actttggagt 540

tactaa 546

<210> 14

<211> 181

<212> PRT

<213> Arabidopsis thaliana

<400> 14

Met Glu Asn Asp Asp Ile Thr Val Ala Glu Met Lys Pro Lys Lys Arg
1 5 10 15

Ala Gly Arg Arg Ile Phe Lys Glu Thr Arg His Pro Ile Tyr Arg Gly
20 25 30

Val Arg Arg Arg Asp Gly Asp Lys Trp Val Cys Glu Val Arg Glu Pro
35 40 45

Ile His Gln Arg Arg Val Trp Leu Gly Thr Tyr Pro Thr Ala Asp Met
50 55 60

Ala Ala Arg Ala His Asp Val Ala Val Leu Ala Leu Arg Gly Arg Ser
65 70 75 80

Ala Cys Leu Asn Phe Ser Asp Ser Ala Trp Arg Leu Pro Val Pro Ala
85 90 95

Ser Thr Asp Pro Asp Thr Ile Arg Arg Thr Ala Ala Glu Ala Ala Glu
100 105 110

Met Phe Arg Pro Pro Glu Phe Ser Thr Gly Ile Thr Val Leu Pro Ser
115 120 125

Ala Ser Glu Phe Asp Thr Ser Asp Glu Gly Val Ala Gly Met Met Met
130 135 140

Arg Leu Ala Glu Glu Pro Leu Met Ser Pro Pro Arg Ser Tyr Ile Asp
145 150 155 160

Met Asn Thr Ser Val Tyr Val Asp Glu Glu Met Cys Tyr Glu Asp Leu
165 170 175

Ser Leu Trp Ser Tyr
180

<210> 15

<211> 630

<212> DNA

<213> Arabidopsis thaliana

<400> 15

atgaataatg atgatattat tctggcggag atgaggccta agaagcgtgc gggaaggaga 60
gtgtttaagg agacacgtca cccagtttac agaggcataa ggcggaggaa cggtgacaaa 120
tgggtctgcg aagtcagaga accgacgcac caacgccgca tttggctcgg gacttatccc 180
acagcagata tggcagcgcg tgcacacgac gtggcggttt tagctctgcg tgggagatcc 240
gcatgtttga atttcgccga ctccgcttgg cggcttccgg tgccggaatc caatgatccg 300
gatgtgataa gaagagttgc ggcggaagct gcggagatgt ttaggccggt ggatttagaa 360
agtggaatta cggttttgcc ttgtgcggga gatgatgtgg atttgggttt tggttcgggt 420
tccggctctg gttcgggatc ggaggagagg aattcttctt cgtatggatt tggagactac 480
gaagaagtct caacgacgat gatgagactc gcggaggggc cactaatgtc gccgccgcga 540
tcgtatatgg aagacatgac tcctactaat gtttacacgg aagaagagat gtgttatgaa 600
gatatgtcat tgtggagtta cagatattaa 630

<210> 16

<211> 209

<212> PRT

<213> Arabidopsis thaliana

<400> 16

Met Asn Asn Asp Asp Ile Ile Leu Ala Glu Met Arg Pro Lys Lys Arg
1 5 10 15
Ala Gly Arg Arg Val Phe Lys Glu Thr Arg His Pro Val Tyr Arg Gly
20 25 30

Ile Arg Arg Arg Asn Gly Asp Lys Trp Val Cys Glu Val Arg Glu Pro

35 40 45

Thr His Gln Arg Arg Ile Trp Leu Gly Thr Tyr Pro Thr Ala Asp Met
50 55 60

Ala Ala Arg Ala His Asp Val Ala Val Leu Ala Leu Arg Gly Arg Ser
65 70 75 80

Ala Cys Leu Asn Phe Ala Asp Ser Ala Trp Arg Leu Pro Val Pro Glu
85 90 95

Ser Asn Asp Pro Asp Val Ile Arg Arg Val Ala Ala Glu Ala Ala Glu
100 105 110

Met Phe Arg Pro Val Asp Leu Glu Ser Gly Ile Thr Val Leu Pro Cys
115 120 125

Ala Gly Asp Asp Val Asp Leu Gly Phe Gly Ser Gly Ser Gly Ser Gly
130 135 140

Ser Gly Ser Glu Glu Arg Asn Ser Ser Ser Tyr Gly Phe Gly Asp Tyr
145 150 155 160

Glu Glu Val Ser Thr Thr Met Met Arg Leu Ala Glu Gly Pro Leu Met
165 170 175
Ser Pro Pro Arg Ser Tyr Met Glu Asp Met Thr Pro Thr Asn Val Tyr
180 185 190

Thr Glu Glu Glu Met Cys Tyr Glu Asp Met Ser Leu Trp Ser Tyr Arg
195 200 205

Tyr

<210> 17

<211> 1026

<212> DNA

<213> Arabidopsis thaliana

<400> 17

atgccgtcgg agattgttga caggaaaagg aagtctcgtg gaacacgaga tgtagctgag 60
attctaaggc aatggagaga gtacaatgag cagattgagg cagaatcttg tatcgatggt 120
ggtggtccaa aatcaatccg aaagcctcct ccaaaaggtt cgaggaaggg ttgtatgaaa 180
ggtaaaggtg gacctgaaaa cgggatttgt gactatagag gagttagaca gaggagatgg 240
ggtaaatggg ttgctgagat ccgtgagcca gacggaggtg ctaggttgtg gctcggtact 300
ttctccagtt catatgaagc tgcattggct tatgacgagg cggccaaagc tatatatggt 360
cagtctgcca gactcaatct tcccgagatc acaaatcgct cttcttcgac tgctgccact 420
gccactgtgt caggctcggt tactgcattt tctgatgaat ctgaagtttg tgcacgtgag 480
gatacaaatg caagttcagg ttttggtcag gtgaaactag aggattgtag cgatgaatat 540
gttctcttag atagttctca gtgtattaaa gaggagctga aaggaaaaga ggaagtgagg 600
gaagaacata acttggctgt tggttttgga attggacagg actcgaaaag ggagactttg 660
gatgcttggt tgatgggaaa tggcaatgaa caagaaccat tggagtttgg tgtggatgaa 720
acgtttgata ttaatgagct attgggtata ttaaacgaca acaatgtgtc tggtcaagag 780
acaatgcagt atcaagtgga tagacaccca aatttcagtt accaaacgca gtttccaaat 840
tctaacttgc tcgggagcct caaccctatg gagattgctc aaccaggagt tgattatgga 900
tgtccttatg tgcagcccag tgatatggag aactatggta ttgatttaga ccatcgcagg 960
ttcaatgatc ttgacataca ggacttggat tttggaggag acaaagatgt tcatggatct 1020
acataa 1026

<210> 18

<211> 341

<212> PRT

<213> Arabidopsis thaliana

<400> 18

```
Met Pro Ser Glu Ile Val Asp Arg Lys Arg Lys Ser Arg Gly Thr Arg
 1               5                  10                  15

Asp Val Ala Glu Ile Leu Arg Gln Trp Arg Glu Tyr Asn Glu Gln Ile
            20                  25                  30

Glu Ala Glu Ser Cys Ile Asp Gly Gly Gly Pro Lys Ser Ile Arg Lys
        35                  40                  45

Pro Pro Pro Lys Gly Ser Arg Lys Gly Cys Met Lys Gly Lys Gly Gly
    50                  55                  60

Pro Glu Asn Gly Ile Cys Asp Tyr Arg Gly Val Arg Gln Arg Arg Trp
65                  70                  75                  80
Gly Lys Trp Val Ala Glu Ile Arg Glu Pro Asp Gly Gly Ala Arg Leu
                85                  90                  95

Trp Leu Gly Thr Phe Ser Ser Ser Tyr Glu Ala Ala Leu Ala Tyr Asp
            100                 105                 110

Glu Ala Ala Lys Ala Ile Tyr Gly Gln Ser Ala Arg Leu Asn Leu Pro
        115                 120                 125

Glu Ile Thr Asn Arg Ser Ser Ser Thr Ala Ala Thr Ala Thr Val Ser
```

130 135 140

Gly Ser Val Thr Ala Phe Ser Asp Glu Ser Glu Val Cys Ala Arg Glu
145 150 155 160

Asp Thr Asn Ala Ser Ser Gly Phe Gly Gln Val Lys Leu Glu Asp Cys
165 170 175

Ser Asp Glu Tyr Val Leu Leu Asp Ser Ser Gln Cys Ile Lys Glu Glu
180 185 190

Leu Lys Gly Lys Glu Glu Val Arg Glu Glu His Asn Leu Ala Val Gly
195 200 205

Phe Gly Ile Gly Gln Asp Ser Lys Arg Glu Thr Leu Asp Ala Trp Leu
210 215 220

Met Gly Asn Gly Asn Glu Gln Glu Pro Leu Glu Phe Gly Val Asp Glu
225 230 235 240
Thr Phe Asp Ile Asn Glu Leu Leu Gly Ile Leu Asn Asp Asn Asn Val
245 250 255

Ser Gly Gln Glu Thr Met Gln Tyr Gln Val Asp Arg His Pro Asn Phe
260 265 270

Ser Tyr Gln Thr Gln Phe Pro Asn Ser Asn Leu Leu Gly Ser Leu Asn
275 280 285

Pro Met Glu Ile Ala Gln Pro Gly Val Asp Tyr Gly Cys Pro Tyr Val
290 295 300

Gln Pro Ser Asp Met Glu Asn Tyr Gly Ile Asp Leu Asp His Arg Arg
305 310 315 320

Phe Asn Asp Leu Asp Ile Gln Asp Leu Asp Phe Gly Gly Asp Lys Asp
325 330 335

Val His Gly Ser Thr
340

<210> 19
<211> 621
<212> DNA
<213> Arabidopsis thaliana

<400> 19
atgtcatcca tagagccaaa agtaatgatg gttggtgcta ataagaaaca acgaaccgtc 60
caagctagtt cgaggaaagg ttgtatgaga ggaaaaggtg gacccgataa cgcgtcttgc 120
acttacaaag gtgttagaca acgcacttgg ggcaaatggg tcgctgagat ccgcgagcct 180
aaccgaggag ctcgtctttg gctcggtacc ttcgacacct cccgtgaagc tgccttggct 240
tatgactccg cagctcgtaa gctctatggg cctgaggctc atctcaacct ccctgagtcc 300
ttaagaagtt accctaaaac ggcgtcgtct ccggcgtccc agactacacc aagcagcaac 360
accggtggaa aaagcagcag cgactctgag tcgccgtgtt catccaacga gatgtcatca 420
tgtggaagag tgacagagga gatatcatgg gagcatataa acgtggattt gccggtaatg 480
gatgattctt caatatggga agaagctaca atgtcgttag gatttccatg ggttcatgaa 540
ggagataatg atatttctcg gtttgatact tgtatttccg gtggctattc taattgggat 600
tcctttcatt ccccactttg a 621

<210> 20

<211> 206

<212> PRT

<213> Arabidopsis thaliana

<400> 20

```
Met Ser Ser Ile Glu Pro Lys Val Met Met Val Gly Ala Asn Lys Lys
 1               5                  10                  15

Gln Arg Thr Val Gln Ala Ser Ser Arg Lys Gly Cys Met Arg Gly Lys
            20                  25                  30

Gly Gly Pro Asp Asn Ala Ser Cys Thr Tyr Lys Gly Val Arg Gln Arg
        35                  40                  45

Thr Trp Gly Lys Trp Val Ala Glu Ile Arg Glu Pro Asn Arg Gly Ala
    50                  55                  60

Arg Leu Trp Leu Gly Thr Phe Asp Thr Ser Arg Glu Ala Ala Leu Ala
65                  70                  75                  80

Tyr Asp Ser Ala Ala Arg Lys Leu Tyr Gly Pro Glu Ala His Leu Asn
                85                  90                  95

Leu Pro Glu Ser Leu Arg Ser Tyr Pro Lys Thr Ala Ser Ser Pro Ala
            100                 105                 110

Ser Gln Thr Thr Pro Ser Ser Asn Thr Gly Gly Lys Ser Ser Ser Asp
        115                 120                 125

Ser Glu Ser Pro Cys Ser Ser Asn Glu Met Ser Ser Cys Gly Arg Val
```

130 135 140

Thr Glu Glu Ile Ser Trp Glu His Ile Asn Val Asp Leu Pro Val Met
145 150 155 160

Asp Asp Ser Ser Ile Trp Glu Glu Ala Thr Met Ser Leu Gly Phe Pro
165 170 175

Trp Val His Glu Gly Asp Asn Asp Ile Ser Arg Phe Asp Thr Cys Ile
180 185 190

Ser Gly Gly Tyr Ser Asn Trp Asp Ser Phe His Ser Pro Leu
195 200 205

<210> 21

<211> 975

<212> DNA

<213> Arabidopsis thaliana

<400> 21

atggaaaagg aagataacgg atcgaaacag agctcctctg cttctgttgt atcctcgaga 60
agacgaagaa gagtggttga gccagtggaa gcgacgttac agagatggga ggaagaagga 120
ttggcgagag ctcgtagggt tcaagccaaa ggttcgaaga aaggttgtat gagaggaaaa 180
ggtggaccag agaatcctgt ttgtcggttt agaggtgttc gacaaagggt ttgggggaaa 240
tgggttgctg agatacgtga accagtgagt caccgtggtg caaactctag tcgtagtaaa 300
cggctttggc ttggcacgtt tgctactgca gctgaagctg ctttggctta cgacagagct 360
gctagtgtca tgtacggacc ctatgccagg ttaaatttcc cggaagattt gggtggggga 420
aggaagaagg acgaggaggc ggaaagttcg ggaggctatt ggttggaaac taacaaagcc 480
ggtaatggcg tgattgaaac ggaaggtgga aaagactatg tagtctacaa tgaagacgct 540
attgagcttg gccatgacaa gactcagaat cctgacatgt ttgatgtcga tgagcttcta 600
cgtgacctaa atggcgacga tgtgtttgca ggcatgactg ataatgaaat agtgaaccca 660

gcagttaaat caggaccggt acccggggaa cagtgttgcc aacggttcat acaggcccga 720
gagttgaaat cagaggaagg ttacagctat gatcgattca aattggcaac aaagtggttt 780
tgatccgcta caaagcctca actacggaat acctccgttt cagctcataa cggattgttg 840
tataatgaac ctcaaagctc cagttatcac gagggaaagg atggtaatgg attcttcgac 900
gacttgagtt acttggatct ggagaactaa cagggaggtg gattcgattc atattttgag 960
tatttcagat tctag 975

<210> 22
<211> 244
<212> PRT
<213> Arabidopsis thaliana

<400> 22

Met	Glu	Lys	Glu	Asp	Asn	Gly	Ser	Lys	Gln	Ser	Ser	Ser	Ala	Ser	Val
1				5				10					15		

Val	Ser	Ser	Arg	Arg	Arg	Arg	Arg	Val	Val	Glu	Pro	Val	Glu	Ala	Thr
			20					25					30		

Leu	Gln	Arg	Trp	Glu	Glu	Glu	Gly	Leu	Ala	Arg	Ala	Arg	Arg	Val	Gln
		35					40					45			

Ala	Lys	Gly	Ser	Lys	Lys	Gly	Cys	Met	Arg	Gly	Lys	Gly	Gly	Pro	Glu
	50					55					60				

Asn	Pro	Val	Cys	Arg	Phe	Arg	Gly	Val	Arg	Gln	Arg	Val	Trp	Gly	Lys
65					70					75					80

Trp	Val	Ala	Glu	Ile	Arg	Glu	Pro	Val	Ser	His	Arg	Gly	Ala	Asn	Ser
				85					90					95	

Ser Arg Ser Lys Arg Leu Trp Leu Gly Thr Phe Ala Thr Ala Ala Glu
100 105 110

Ala Ala Leu Ala Tyr Asp Arg Ala Ala Ser Val Met Tyr Gly Pro Tyr
115 120 125

Ala Arg Leu Asn Phe Pro Glu Asp Leu Gly Gly Gly Arg Lys Lys Asp
130 135 140
Glu Glu Ala Glu Ser Ser Gly Gly Tyr Trp Leu Glu Thr Asn Lys Ala
145 150 155 160

Gly Asn Gly Val Ile Glu Thr Glu Gly Gly Lys Asp Tyr Val Val Tyr
165 170 175

Asn Glu Asp Ala Ile Glu Leu Gly His Asp Lys Thr Gln Asn Pro Met
180 185 190

Thr Asp Asn Glu Ile Val Asn Pro Ala Val Lys Ser Glu Glu Gly Tyr
195 200 205

Ser Tyr Asp Arg Phe Lys Leu Asp Asn Gly Leu Leu Tyr Asn Glu Pro
210 215 220

Gln Ser Ser Ser Tyr His Gln Gly Gly Gly Phe Asp Ser Tyr Phe Glu
225 230 235 240

Tyr Phe Arg Phe

<210> 23

<211> 834

<212> DNA

<213> Arabidopsis thaliana

<400> 23

atggagaaat catcctcaat gaaacaatgg aagaagggtc ctgctcgggg taaaggcggt 60
ccacaaaacg ctctttgtca gtaccgtgga gtcaggcaaa ggacttgggg caaatgggtg 120
gctgagatca gagagcccaa gaagagggca agactttggc ttggctcttt cgctacagct 180
gaagaagcag ctatggctta tgatgaggct gccttgaaac tctatgggca cgacgcatac 240
ctcaacttac ctcatcttca gcggaataca agaccttctc tgagtaactc tcagaggttc 300
aaatgggtac cttcaaggaa gtttatatct atgtttcctt catgtggtat gctaaacgtg 360
aatgctcagc ctagtgttca cataatccag caaagactag aagaactcaa gaaaactgga 420
cttttatctc aatcctattc ttctagttct tcctccaccg aatcaaaaac taatactagc 480
tttcttgatg agaagaccag caagggagaa acagacaata tgttcgaagg tggtgatcag 540
aagaaaccag agatcgacct gaccgagttt cttcagcaac taggaatctt gaaggatgaa 600
aatgaagcag aaccaagtga ggtagcagag tgtcattccc ctccaccatg gaacgagcaa 660
gaagaaactg gaagtccttt cagaactgag aatttcagct gggataccct gatcgagatg 720
ccaagaagtg aaaccacaac tatgcaattt gactccagca acttcggaag ctatgatttt 780
gaggatgatg tatccttccc ttccatctgg gactactacg gaagcttaga ttga 834

<210> 24

<211> 277

<212> PRT

<213> Arabidopsis thaliana

<400> 24

Met Glu Lys Ser Ser Ser Met Lys Gln Trp Lys Lys Gly Pro Ala Arg
1 5 10 15

Gly Lys Gly Gly Pro Gln Asn Ala Leu Cys Gln Tyr Arg Gly Val Arg
20 25 30

Gln Arg Thr Trp Gly Lys Trp Val Ala Glu Ile Arg Glu Pro Lys Lys
35 40 45

Arg Ala Arg Leu Trp Leu Gly Ser Phe Ala Thr Ala Glu Glu Ala Ala
50 55 60

Met Ala Tyr Asp Glu Ala Ala Leu Lys Leu Tyr Gly His Asp Ala Tyr
65 70 75 80

Leu Asn Leu Pro His Leu Gln Arg Asn Thr Arg Pro Ser Leu Ser Asn
85 90 95

Ser Gln Arg Phe Lys Trp Val Pro Ser Arg Lys Phe Ile Ser Met Phe
100 105 110

Pro Ser Cys Gly Met Leu Asn Val Asn Ala Gln Pro Ser Val His Ile
115 120 125

Ile Gln Gln Arg Leu Glu Glu Leu Lys Lys Thr Gly Leu Leu Ser Gln
130 135 140

Ser Tyr Ser Ser Ser Ser Ser Ser Thr Glu Ser Lys Thr Asn Thr Ser
145 150 155 160

Phe Leu Asp Glu Lys Thr Ser Lys Gly Glu Thr Asp Asn Met Phe Glu
165 170 175

Gly Gly Asp Gln Lys Lys Pro Glu Ile Asp Leu Thr Glu Phe Leu Gln
180 185 190
Gln Leu Gly Ile Leu Lys Asp Glu Asn Glu Ala Glu Pro Ser Glu Val
195 200 205

Ala Glu Cys His Ser Pro Pro Pro Trp Asn Glu Gln Glu Glu Thr Gly
210 215 220

Ser Pro Phe Arg Thr Glu Asn Phe Ser Trp Asp Thr Leu Ile Glu Met
225 230 235 240

Pro Arg Ser Glu Thr Thr Thr Met Gln Phe Asp Ser Ser Asn Phe Gly
245 250 255

Ser Tyr Asp Phe Glu Asp Asp Val Ser Phe Pro Ser Ile Trp Asp Tyr
260 265 270

Tyr Gly Ser Leu Asp
275

<210> 25
<211> 924
<212> DNA
<213> Arabidopsis thaliana

<400> 25
atggaagaag agcaacctcc ggccaagaaa cgaaacatgg ggagatctag aaaaggttgc 60
atgaaaggta aaggcggtcc agagaacgcc acgtgtactt tccgtggagt taggcaacgg 120

acttggggta aatgggtggc tgagatccgt gagcctaacc gtgggactcg tctctggctc 180
ggcacgttta atacctcggt cgaggccgcc atggcttacg atgaagccgc taagaaactc 240
tatggacacg aggctaaact caacttggtg cacccacaac aacaacaaca agtagtagtg 300
aacagaaact tgtctttttc tggccacggg tcgggttctt gggcttataa taagaagctc 360
gatatggttc atgggttgga ccttggtctc ggccaggcaa gttgttcacg aggttcttgc 420
tcagagagat cgagttttct acaagaagat gatgatcata gtcataatcg atgttcgtct 480
tcaagtggtt cgaatctttg ttggttatta cctaaacaaa gtgattcaca agatcaagag 540
accgttaatg ctacgactag ttatggcggt gaaggcggtg gtggctctac gttaacgttt 600
tcgaccaatt tgaaaccaaa gaatttgatg agtcagaatt atggattata caatggagct 660
tggtctaggt ttcttgtggg gcaagaaaag aagacggaac atgacgtgtc atcgtcgtgt 720
ggatcgtcgg acaacaagga gagtatgttg gttcctagtt gcggcggaga gaggatgcat 780
aggccggagt tggaagagcg aacaggatat ttggaaatgg atgatctttt ggagattgat 840
gatttaggtt tgttgattgg caaaaatgga gatttcaaga attggtgttg tgaagagttt 900
caacatccat ggaattggtt ctga 924

<210> 26
<211> 306
<212> PRT
<213> Arabidopsis thaliana

<400> 26
Glu Glu Glu Gln Pro Pro Ala Lys Lys Arg Asn Met Gly Arg Ser Arg
1 5 10 15

Lys Gly Cys Met Lys Gly Lys Gly Gly Pro Glu Asn Ala Thr Cys Thr
20 25 30

Phe Arg Gly Val Arg Gln Arg Thr Trp Gly Lys Trp Val Ala Glu Ile
35 40 45
Arg Glu Pro Asn Arg Gly Thr Arg Leu Trp Leu Gly Thr Phe Asn Thr

50 55 60

Ser Val Glu Ala Ala Met Ala Tyr Asp Glu Ala Ala Lys Lys Leu Tyr
65 70 75 80

Gly His Glu Ala Lys Leu Asn Leu Val His Pro Gln Gln Gln Gln Gln
85 90 95

Val Val Val Asn Arg Asn Leu Ser Phe Ser Gly His Gly Ser Gly Ser
100 105 110

Trp Ala Tyr Asn Lys Lys Leu Asp Met Val His Gly Leu Asp Leu Gly
115 120 125

Leu Gly Gln Ala Ser Cys Ser Arg Gly Ser Cys Ser Glu Arg Ser Ser
130 135 140

Phe Leu Gln Glu Asp Asp Asp His Ser His Asn Arg Cys Ser Ser Ser
145 150 155 160

Ser Gly Ser Asn Leu Cys Trp Leu Leu Pro Lys Gln Ser Asp Ser Gln
165 170 175

Asp Gln Glu Thr Val Asn Ala Thr Thr Ser Tyr Gly Gly Glu Gly Gly
180 185 190

Gly Gly Ser Thr Leu Thr Phe Ser Thr Asn Leu Lys Pro Lys Asn Leu
195 200 205

Met Ser Gln Asn Tyr Gly Leu Tyr Asn Gly Ala Trp Ser Arg Phe Leu
210 215 220

Val Gly Gln Glu Lys Lys Thr Glu His Asp Val Ser Ser Ser Cys Gly
225 230 235 240

Ser Ser Asp Asn Lys Glu Ser Met Leu Val Pro Ser Cys Gly Gly Glu
245 250 255

Arg Met His Arg Pro Glu Leu Glu Glu Arg Thr Gly Tyr Leu Glu Met
260 265 270

Asp Asp Leu Leu Glu Ile Asp Asp Leu Gly Leu Leu Ile Gly Lys Asn
275 280 285

Gly Asp Phe Lys Asn Trp Cys Cys Glu Glu Phe Gln His Pro Trp Asn
290 295 300

Trp Phe
305

<210> 27
<211> 534
<212> DNA
<213> Arabidopsis thaliana

<400> 27
atgcccagga aacggaagtc tcgtggaaca cgagatgtag ctgagattct aaggaaatgg 60
agagagtaca atgagcagac cgaggcagat tcttgcatcg atggtggtgg ttcaaaacca 120
atccgaaagg ctcctccaaa acgttcgagg aagggttgta tgaaaggtaa aggtggacct 180
gaaaatggga tttgtgacta tacaggagtt agacagagga catggggtaa atgggttgct 240

gagatccgtg agccaggccg aggtgctaag ttatggctcg gtactttctc tagttcatat 300
gaagctgcat tggcttatga tgaggcttcc aaagctattt acggtcagtc tgcccgactc 360
aatcttccac tgctgccact gtgtcaggct cggttactgc attttctgat gaatctgaag 420
tttgtgcacg tgaggataca aatgcaagat ctggttttgg tcagatctct aacttctcgc 480
atttccaaaa tgttaagtcc aataactgca ttggttaagt tggggcgtta ctag 534

<210> 28
<211> 177
<212> PRT
<213> Arabidopsis thaliana

<400> 28

Met Pro Arg Lys Arg Lys Ser Arg Gly Thr Arg Asp Val Ala Glu Ile
1 5 10 15

Leu Arg Lys Trp Arg Glu Tyr Asn Glu Gln Thr Glu Ala Asp Ser Cys
20 25 30

Ile Asp Gly Gly Gly Ser Lys Pro Ile Arg Lys Ala Pro Pro Lys Arg
35 40 45

Ser Arg Lys Gly Cys Met Lys Gly Lys Gly Gly Pro Glu Asn Gly Ile
50 55 60
Cys Asp Tyr Thr Gly Val Arg Gln Arg Thr Trp Gly Lys Trp Val Ala
65 70 75 80

Glu Ile Arg Glu Pro Gly Arg Gly Ala Lys Leu Trp Leu Gly Thr Phe
85 90 95

Ser Ser Ser Tyr Glu Ala Ala Leu Ala Tyr Asp Glu Ala Ser Lys Ala

100 105 110

Ile Tyr Gly Gln Ser Ala Arg Leu Asn Leu Pro Leu Leu Pro Leu Cys
115 120 125

Gln Ala Arg Leu Leu His Phe Leu Met Asn Leu Lys Phe Val His Val
130 135 140

Arg Ile Gln Met Gln Asp Leu Val Leu Val Arg Ser Leu Thr Ser Arg
145 150 155 160

Ile Ser Lys Met Leu Ser Pro Ile Thr Ala Leu Val Lys Leu Gly Arg
165 170 175

Tyr

<210> 29
<211> 18
<212> DNA
<213> Artificial Sequence
<220>
<223> Description of Artificial Sequence: Primer

<400> 29
gagtcttcgg tttcctca 18

<210> 30
<211> 18
<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 30

cgatacgtcg tcatcatc 18